

A DOUGLAS-FIR TUSSOCK MOTH
LOSS ASSESSMENT
EVALUATION
1980



SOUTHWESTERN REGION
DEPARTMENT OF AGRICULTURE • FOREST SERVICE

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A DOUGLAS-FIR TUSSOCK MOTH
LOSS ASSESSMENT EVALUATION

Region 3

by

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ABSTRACT

Nine Douglas-fir tussock moth (DFTM), Orgyia pseudotsugata (McD.), infestations occurred in northern New Mexico from 1975-1979. In 1979, DFTM evaluations were conducted in four of the nine canyons where infestations occurred in Douglas-fir, Pseudotsuga menziesii var. glaucia (Beissen.) Franco, and true fir, Abies spp., stands. The results of these evaluations show that the DFTM is capable of causing severe tree losses, particularly in those stands where host trees make up the majority of the tree resource. Tree mortality in stands evaluated ranged from 28 to 97 percent. Top-kill recorded in three of the four stands resulted in damages of 11, 14, and 8 percent. No top-killing of trees was recorded in one stand because almost all of the host trees were killed. Host tree mortality and top-kill to the pole- and sawtimber-size trees ranged between 8 and 31 percent, while losses to regeneration-size trees ranged between 28 and 66 percent.

INTRODUCTION

Douglas-fir tussock moth outbreaks occurred in nine isolated canyons (Fig. 1, Appendix) in northern New Mexico from 1975-1979, and caused severe and widespread losses to Douglas-fir and true fir stands. Outbreak levels of the tussock moth were first observed on the Cibola National Forest in 1976. Within 2 years, eight additional tussock moth infestation centers were detected. The duration, extent, and level of tree losses and damage could not be predicted because there were no records on previous infestations in similar areas.

In the fall of 1979, DFTM damage evaluations were made in four of the nine canyons where infestations occurred in the Douglas-fir and true fir host type. Areas evaluated included Bear Canyon, Elena Gallegos Grant; Medio Dia Canyon, Santa Fe National Forest; and Los Alamos and Pueblo Canyons, Los Alamos County. Damage data collected from these canyons are presented in this report.

OBJECTIVES

The objectives of this evaluation were:

1. Document the location, extent, and duration of the recent infestations.
2. Estimate tree mortality and top-kill in pole- and sawtimber-size Douglas-fir and true fir.
3. Estimate mortality and top-kill to regeneration-size host trees (trees less than 5 inches in diameter).

DESCRIPTIONS OF INFESTATIONS

Cibola National Forest and Adjacent Private Land

Bear Canyon. This outbreak occurred about 5 miles northeast of the city of Albuquerque, on private land within the boundaries of the Elena Gallegos Grant, on the west side of the Sandia Mountains. This canyon is situated west to east, terminating at the base of the mountain crest, with infestation elevations ranging from 7,000 to 8,000 feet (Figs. 2-4, Appendix). DFTM activity was first observed in this area in 1978 on approximately 600 acres of host type, 240 acres of which were heavily defoliated. In June 1979, 600 acres within the infestation boundary were aerially treated with the Douglas-fir tussock moth nucleopolyhedrosis virus. The treatment project was a cooperative effort among New Mexico Department of Natural Resources, Division of Forestry; New Mexico Department of Agriculture, Division of Plant Industry; the Albuquerque Academy; and the Forest Service. Population levels and subsequent defoliation were reduced to extremely low levels by the treatment.

Cañon de Dominga Baca. This infestation was located about 4 miles north of Bear Canyon on the west side of the Sandia Mountains, directly below the aerial tramway. The canyon is situated west to east, terminating at the base of the mountain crest, with infestation elevations ranging from

7,000 to 8,000 feet. Defoliation in this canyon was first observed in 1977 and consisted of two infestation centers (Fig. 5, Appendix). Defoliation was heavy in both areas. In 1978, the area of defoliation increased to and spread onto the Elena Gallegos Grant. A total of 46 acres was defoliated. The infestation collapsed in 1979.

Cañon del Agua. This infestation was located about 6 miles north of Cañon de Dominga Baca, on the west side of the Sandia Mountains. The canyon is situated west to east, terminating at the base of the mountain crest with infestation elevations ranging from 7,200 to 9,100 feet (Fig. 6, Appendix). Moderate to heavy defoliation was first observed in this canyon in 1976. Defoliation by this insect decreased naturally in 1977, but then increased again in 1978. Continued defoliation in 1978 caused severe tree losses on about 70 acres. Defoliation decreased to undetectable levels in 1979.

Cañon del Trigo. This outbreak was located about 25 miles southeast of the city of Albuquerque, on the west side of the Manzano Mountains (Fig. 7, Appendix). The canyon is situated west to east, terminating at the mountain crest, with infestation elevations ranging from 6,500 to 7,600 feet. Defoliation has occurred in this canyon since 1976, and has resulted in complete tree mortality along the canyon floor and heavy mortality on adjacent slopes. Defoliation to the remaining host type at the head of the canyon continued in 1979, but at a low level. Mortality extended over about 52 acres.

Santa Fe National Forest and Adjoining Land of Mixed Ownership

Medio Dia Canyon. This outbreak was located about 25 miles west of the city of Santa Fe. The canyon is situated southeast to northwest, with elevations ranging from 6,500 to 7,500 feet (Fig. 8, Appendix). Defoliation occurred for 4 years, and caused heavy mortality and top-kill to host type over about 125 acres of the canyon floor and lower and upper adjacent slopes. Infestations collapsed in 1978.

Cochiti Canyon. This infestation center was located about 2 miles north of Medio Dia Canyon (Fig. 8, Appendix). The canyon is situated south to north, with infestation elevations ranging from 6,500 to 7,100 feet. The infestation started in 1977. DFTM population densities and subsequent defoliation increased in 1978 causing widespread tree mortality and top-kill to approximately 14 acres of susceptible host type. In 1979, defoliation had decreased to an undetectable level.

Nambe Canyon. This outbreak was located 20 miles north of the city of Santa Fe, on the boundary of the Nambe Indian Reservation and the Santa Fe National Forest (Fig. 9, Appendix). The canyon is situated west to east with infestation elevations ranging from 6,500 to 7,400 feet. Heavy defoliation was first observed in this canyon on the Reservation in 1977. In 1978, the infestation spread onto the Pecos Wilderness, Santa Fe National Forest. Tree mortality was concentrated over about 22 acres of the canyon floor and lower adjacent slopes. Aerial and ground surveys in 1979 revealed no additional defoliation.

Los Alamos and Pueblo Canyons. These infestation centers were located within the townsite of Los Alamos and nearby lands in Los Alamos County, and includes Federal lands managed by the Department of Energy and the Santa Fe National Forest. These canyons are situated east to west. Noticeable defoliation occurred in Los Alamos and Pueblo Canyons in 1976, and by 1979, moderate to complete defoliation occurred on 600 acres of the mixed conifer type in these canyons (Figs. 10 and 11, Appendix). In 1978, a pilot project was conducted to test the efficacy of the DFTM nucleopolyhedrosis virus. As a result of this test, population levels and defoliation in these canyons were reduced to extremely low levels. In 1979, no additional tussock moth defoliation occurred.

METHODS

Aerial Phase

Canyons evaluated were sketch-mapped from the air to delineate acreages of DFTM mortality. Aerial sketch maps (Figs. 2 and 5-10, Appendix) were then used to determine approximate acreages of overall mortality and top-kill for each canyon, and to locate the ground survey plots.

Ground Phase

Fifteen to 20 variable plots were sampled in four canyons: Los Alamos, 15; Pueblo, 20; Medio Dia, 20; and Bear, 18. Sample plots were established at 2-chain intervals along cruise lines, 2 chains apart. Plot establishment was based on two criteria: (1) that all plots sampled be located in the specified mortality boundaries, and (2) plots be established in areas with existing host type.

The variable plot sampling method, using a 20 basal area factor, was used to estimate the number of pole- and sawtimber-size, dominant-codominant trees. Pole- and sawtimber-size trees (trees greater than or equal to 5 inches in d.b.h.) were tallied by species, d.b.h., and condition class (live, dead, top-killed). Host and nonhost trees were measured to the nearest 0.1 inch.

Fixed sample plots (1/100-acre) were superimposed on all variable plots to estimate the loss of understory trees. All host and nonhost trees 0.4 inches to 4.9 inches in d.b.h. were tallied by species, d.b.h., and condition class (live, dead, top-killed). Both host and nonhost trees were measured to the nearest 0.1 inch.

Stand summary tables and statistical analyses were generated using a computer program.¹⁷

¹⁷ Acciavatti, R. E., and B. W. Geils. 1977. A user's guide to "PEST": A computer program for summarizing forest insect and disease damage surveys. Tech. Rep. R3-77-16.

RESULTS AND DISCUSSION

Douglas-fir and true fir stands were heavily depleted of host type in all DFTM infestation sites surveyed. In stands surveyed, tree mortality, excluding nonhost species, ranged from 28 to 97 percent, and top-kill 8 to 14 percent. Estimated tree losses of host species occurring to the pole- and sawtimber-size trees (trees greater than or equal to 5 inches in d.b.h.) ranged from 8 to 31 percent in the four stands evaluated, while mortality and top-kill to understory regeneration-size trees were somewhat heavier and ranged from 28 to 66 percent. Acres of host type killed were concentrated, and located in isolated pockets totaling 405 acres throughout the four canyons surveyed: 130 acres in Bear; 125 acres in Medio Dia; 50 in Los Alamos; 100 in Pueblo. These data are presented in the Appendix by canyon, species, d.b.h., and condition class, and summarized below along with a brief discussion of each infestation site surveyed.

Bear Canyon

An estimated 99 percent of the host type within the area surveyed was killed by the DFTM in this canyon. Losses to host species averaged 434 trees per acre and amounted to 97 percent of all the tree species. Losses to the sapling and pole and sawtimber component were extensive and averaged 66 and 31 percent, respectively. A summary follows.

Stand Data	Sapling-size trees (less than 5 inches d.b.h.)	Pole- & sawtimber-size trees (greater than or equal to 5 inches d.b.h.)	Total
Total trees/acre	305	143	448
Live trees/acre	11	2	13
Dead trees/acre	294	140	434
Top-killed trees/acre	---	---	---
Percent stand live (undamaged)	2	1	3
Percent stand dead	66	31	97
Percent stand top-killed	---	---	---

Medio Dia Canyon

Host tree damages in this canyon averaged 259 trees killed and 62 trees top-killed per acre in all areas surveyed. Total tree densities were reduced from 596 to 337 trees per acre (44 percent). Regeneration-size trees and the pole and sawtimber component sustained 41 and 14 percent of the damages, respectively. A summary follows.

Stand Data	Sapling-size trees (less than 5 inches d.b.h.)	Pole- & sawtimber-size trees (greater than or equal to 5 inches d.b.h.)	Total
Total trees/acre	449	147	596
Live trees/acre	168	100	268
Dead trees/acre	200	59	259
Top-killed trees/acre	40	22	62
Percent stand live (undamaged)	36	9	45
Percent stand dead	34	10	44
Percent stand top-killed	7	4	11

Los Alamos Canyon

Damages to Douglas-fir and true fir host type were heaviest in and around the townsite of Los Alamos, Los Alamos County. Mortality and top-kill in this infestation site averaged 605 and 150 trees per acre, respectively. Total tree densities in the areas surveyed were reduced from 1,068 to 463 trees per acre, or by 57 percent. Fifty-six percent of the damages occurred to sapling-size trees and 15 percent to the pole and sawtimber component. These data are summarized below.

Stand Data	Sapling-size trees (less than 5 inches d.b.h.)	Pole- & sawtimber-size trees (greater than or equal to 5 inches d.b.h.)	Total
Total trees/acre	840	228	1,068
Live trees/acre	247	66	313
Dead trees/acre	480	125	605
Top-killed trees/acre	113	37	150
Percent stand live (undamaged)	23	6	29
Percent stand dead	45	12	57
Percent stand top-killed	11	3	14

Pueblo Canyon

The Pueblo Canyon DFTM infestation, also located within the townsite of Los Alamos, Los Alamos County, sustained the least amount of damages of all the areas surveyed. This may have been because 57 percent of the tree species consisted of ponderosa pine (*Pinus ponderosa* Laws.). Host tree mortality and top-kill in the areas surveyed averaged 171 and 45 trees, respectively. Twenty-eight percent of the stand damages occurred to regeneration-size trees and 8 percent to pole- and sawtimber-size trees. These data are summarized below.

Stand Data	Sapling-size trees (less than 5 inches d.b.h.)	Pole- & sawtimber- size trees (greater than or equal to 5 inches d.b.h.)	Total
Total trees/acre	470	138	608
Live trees/acre	300	92	392
Dead trees/acre	125	46	171
Top-killed trees/acre	45	--	45
Percent stand live (undamaged)	49	15	64
Percent stand dead	20	8	28
Percent stand top-killed	8	--	8

APPENDIX

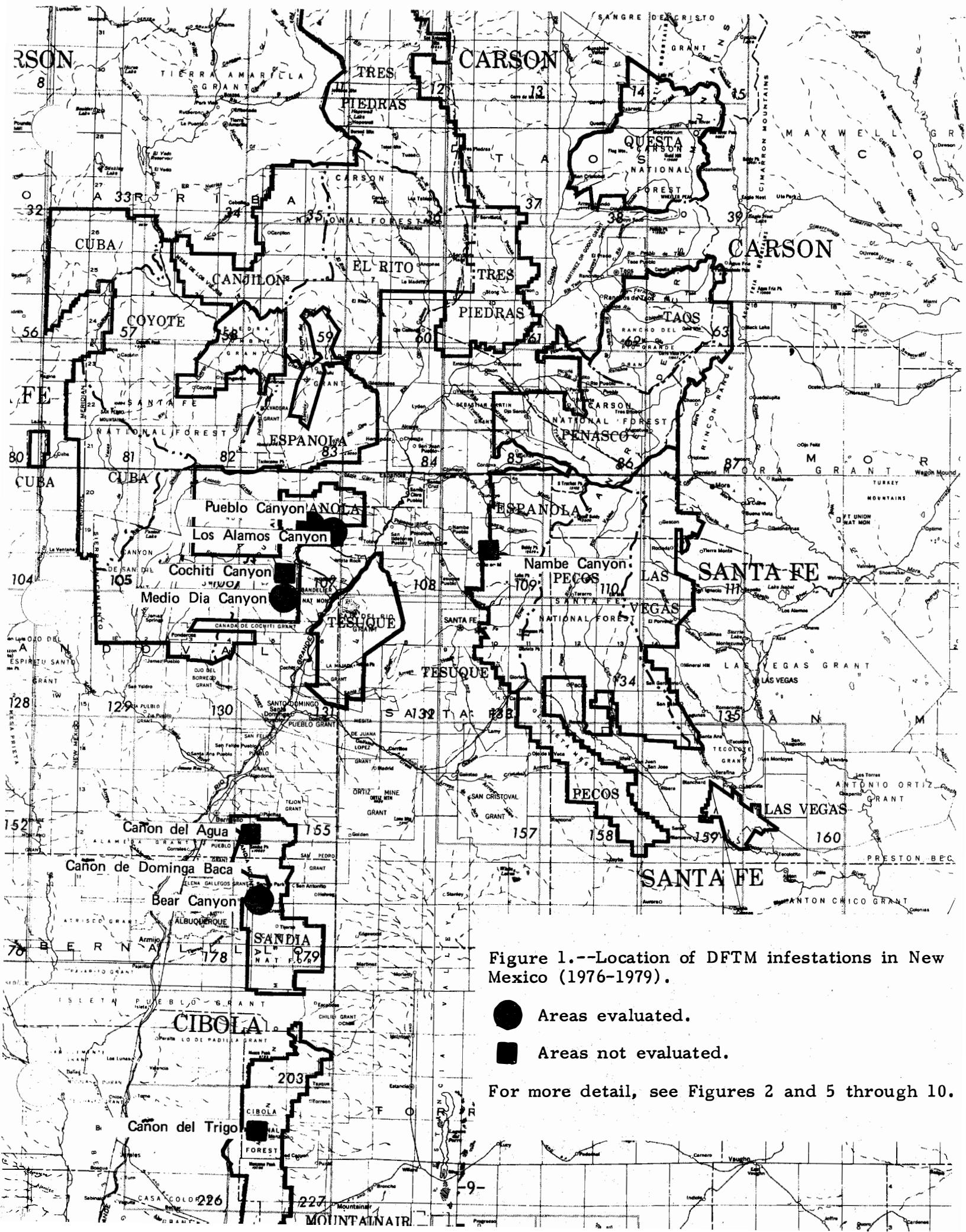


Figure 1.--Location of DFTM infestations in New Mexico (1976-1979).

Areas evaluated.

Areas not evaluated.

For more detail, see Figures 2 and 5 through 10.

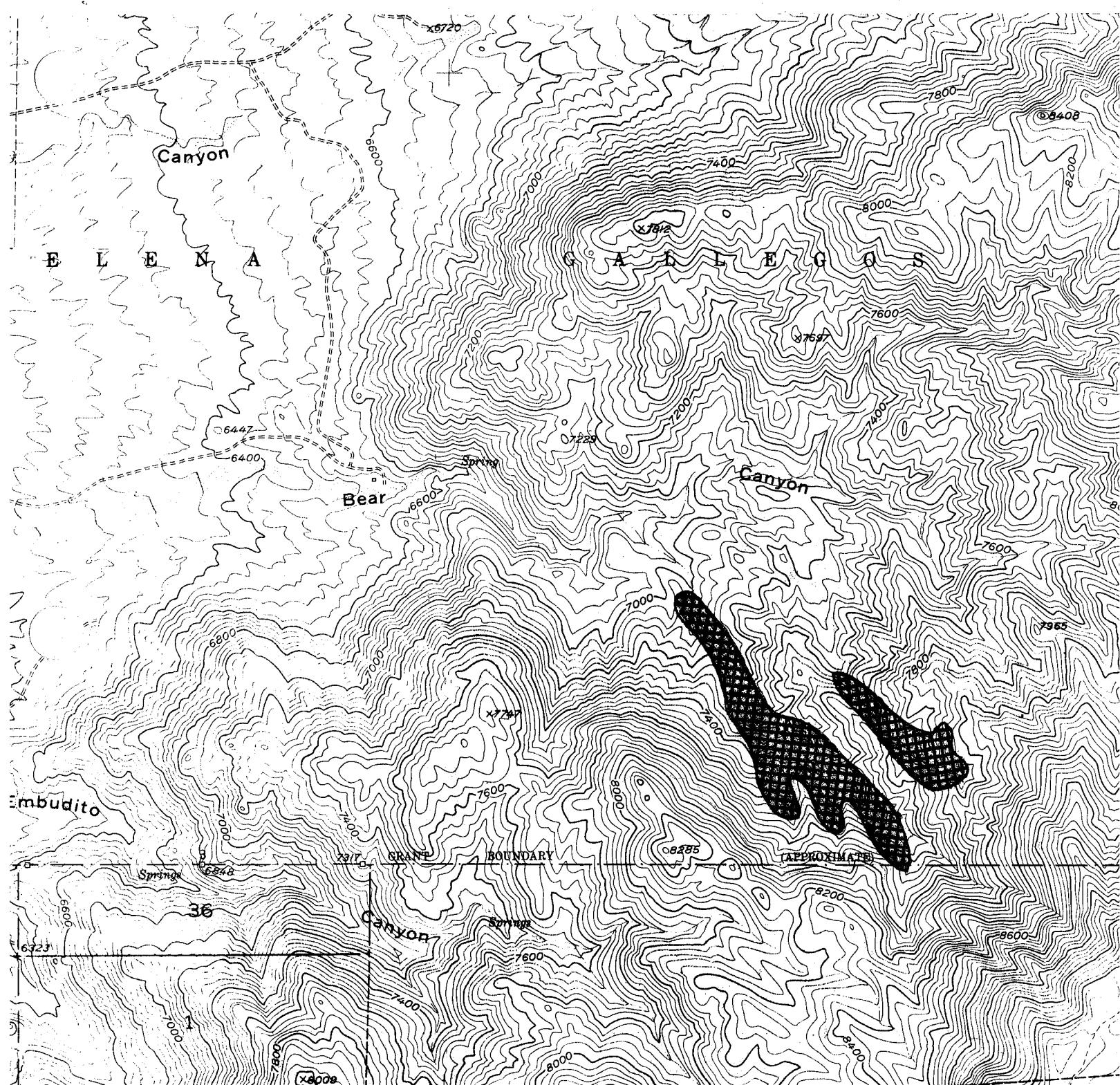


Figure 2.--Douglas-fir tu\$sock moth infestation area, 1979. Bear Canyon, Elena Gallegos Grant.

Scale: 1:24000, 2-3/8 inches to the mile.



Figure 3.--Mortality resulting from DFTM defoliation in 1978 and 1979, Bear Canyon, Elena Gallegos Grant.



Figure 4.--Douglas-fir and true fir mortality in Bear Canyon, Elena Gallegos Grant, 1979.

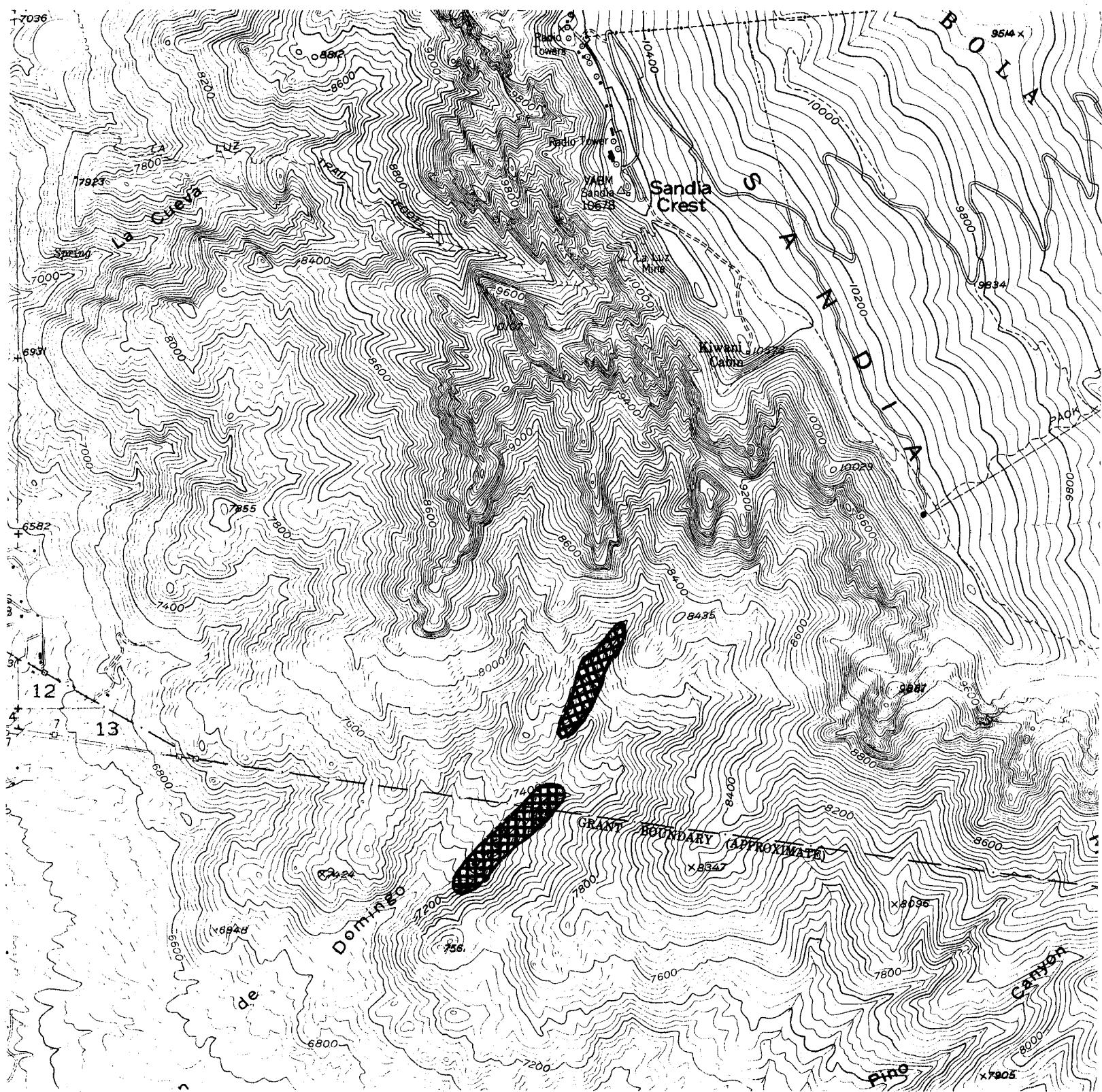


Figure 5.--Douglas-fir tussock moth infestation area, Cañon de Dominga Baca, Sandia Ranger District, Cibola National Forest.

Scale: 1:24000, 2-3/8 inches to the mile.

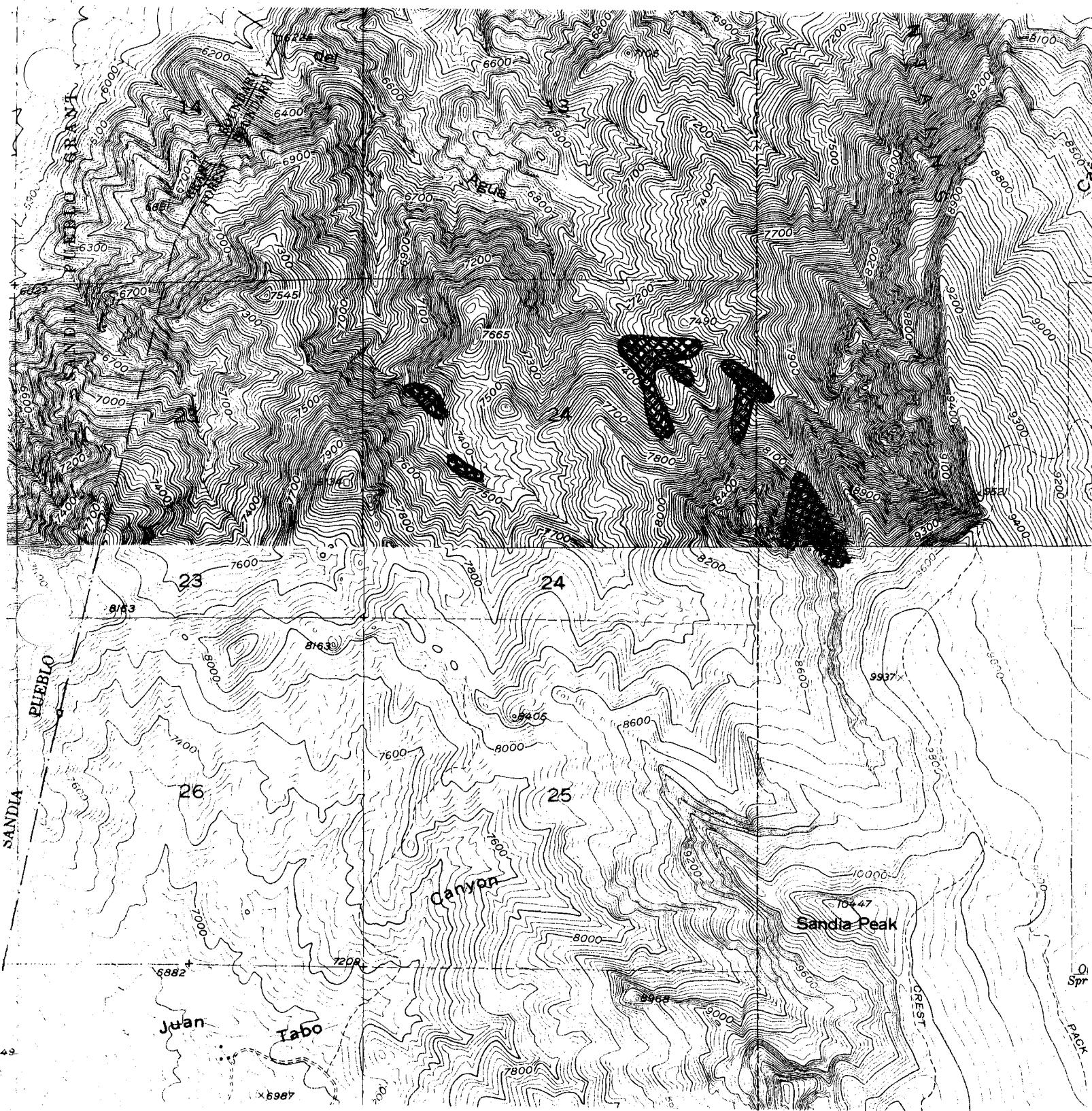


Figure 6.--Cañon del Agua infestation area, Sandia Ranger District, Cibola National Forest.

Scale: 1:24000, 2-3/8 inches to the mile.

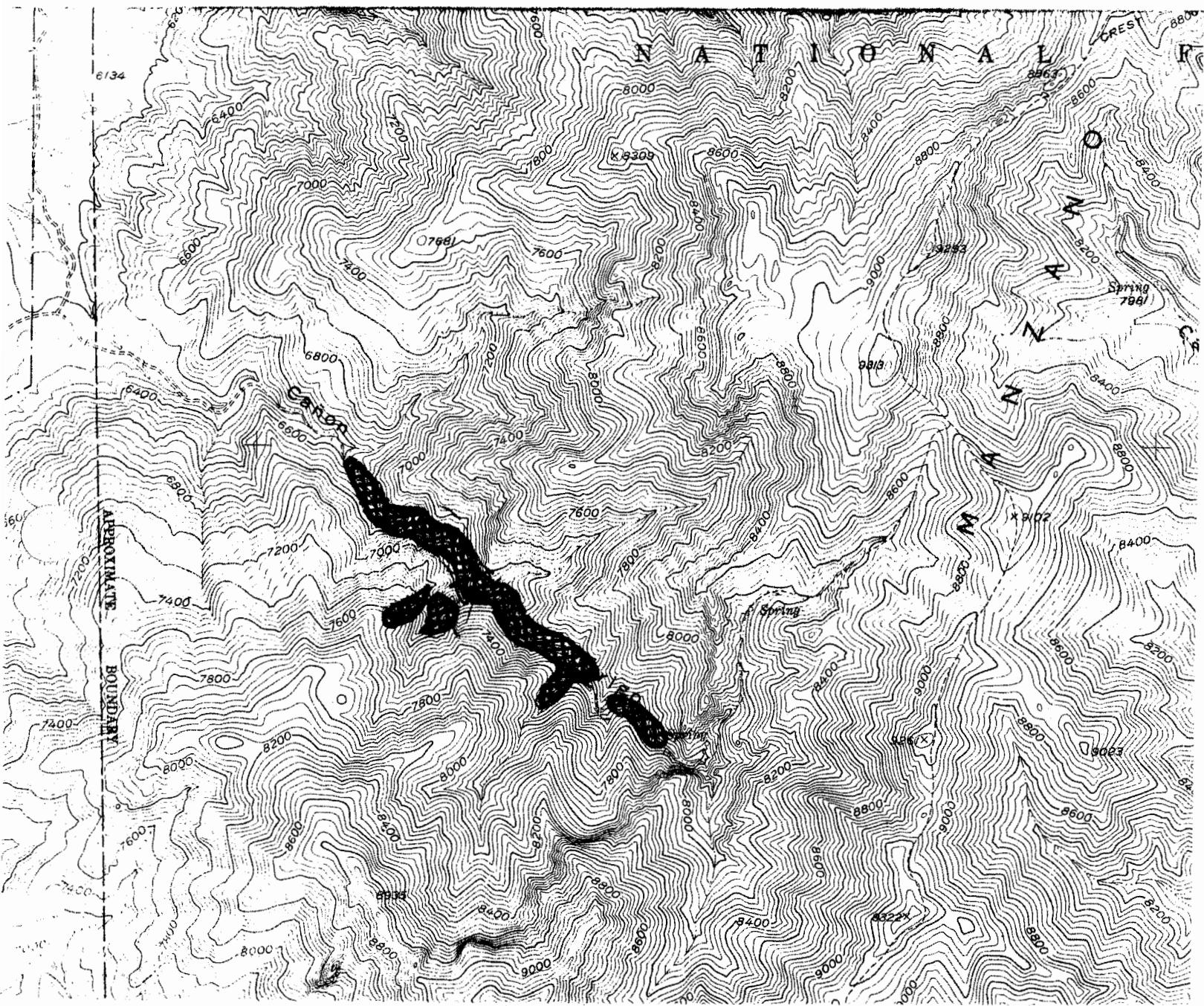


Figure 7.--Douglas-fir tussock moth infestation area, 1979. [~]Canon del Trigo, Mountainair Ranger District, Cibola National Forest.

Scale: 1:24000, 2-3/8 inches to the mile.

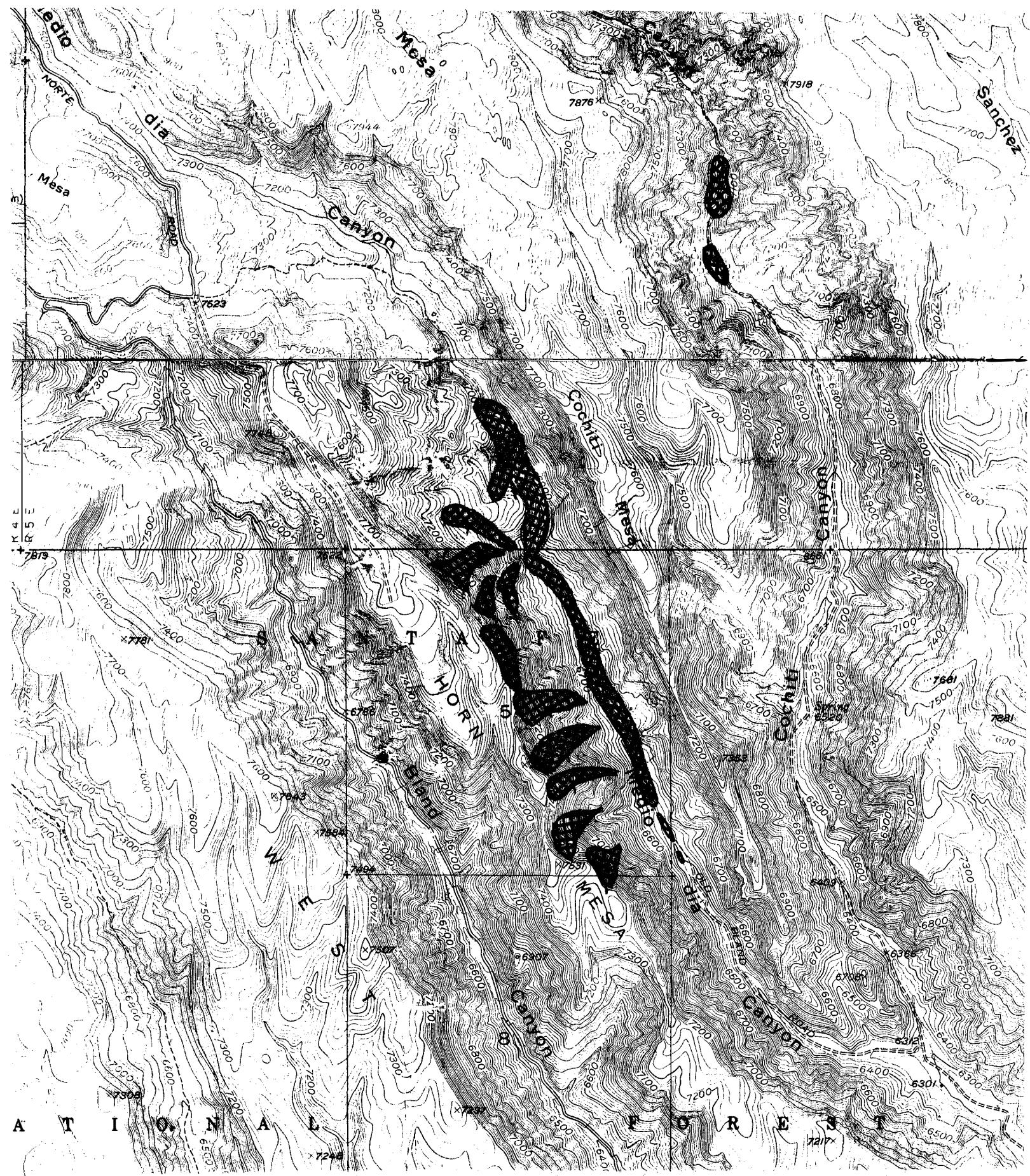


Figure 8.--Douglas-fir tussock moth infestation area, 1979. Medio Dia and Cochiti Canyons, Tesuque Ranger District, Santa Fe National Forest.

Scale: 1:24000, 2-3/8 inches to the mile.

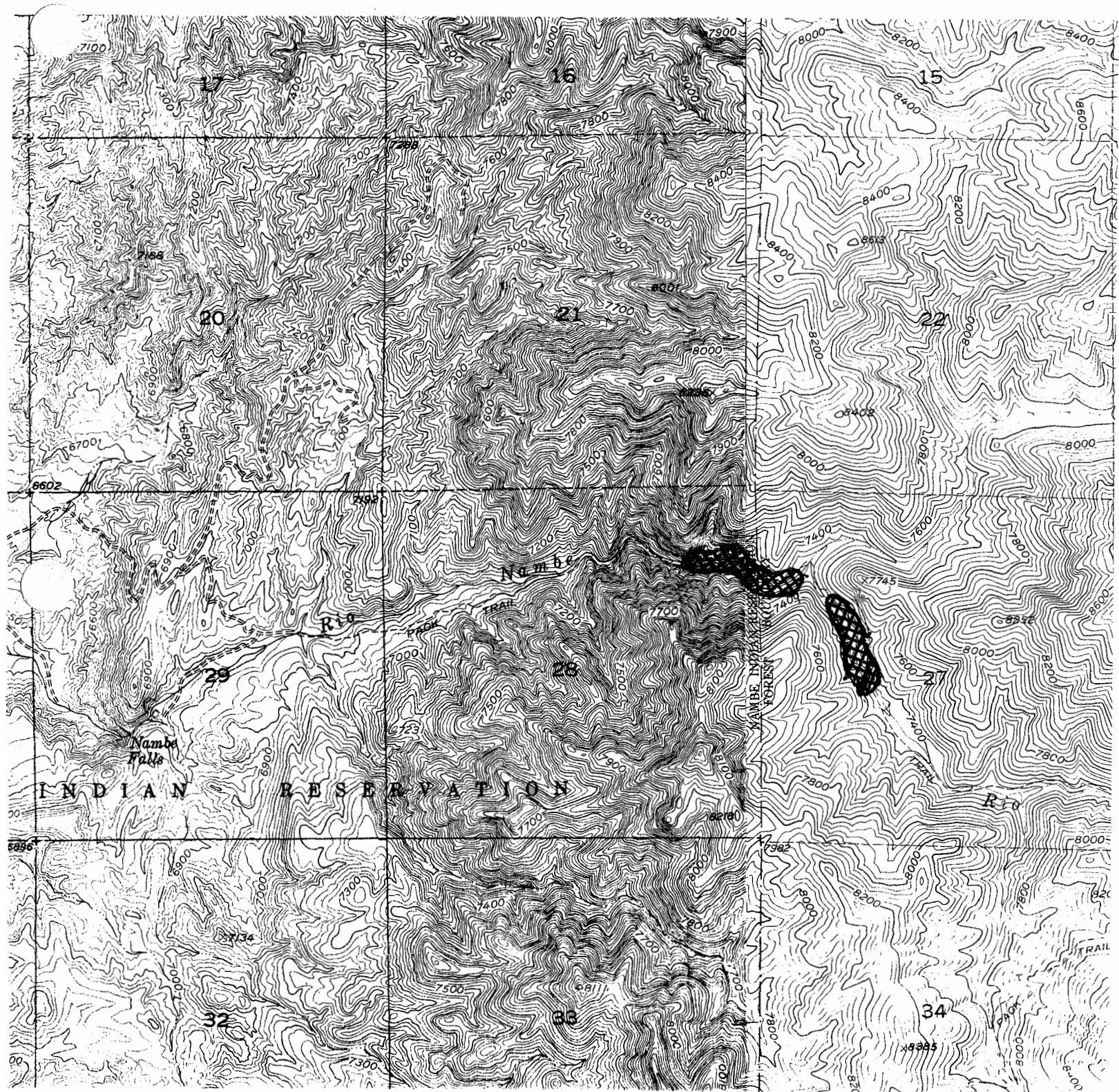


Figure 9.--Douglas-fir tussock moth infestation area, 1979. Nambe Indian Reservation and Pecos Wilderness Area, Santa Fe National Forest.

Scale: 1:24000, 2-3/8 inches to the mile.

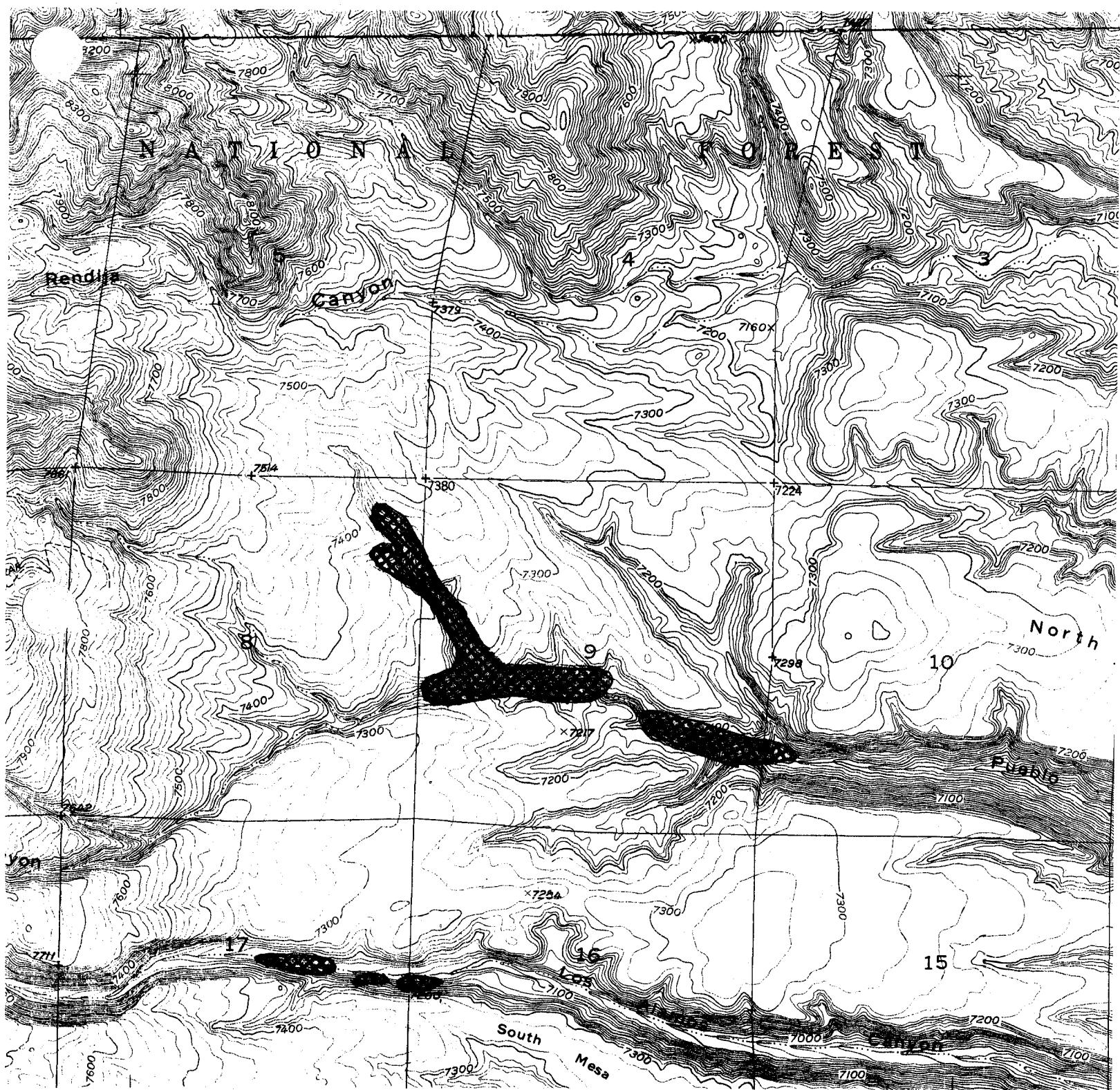


Figure 10.--Douglas-fir tussock moth infestation area, 1979. Los Alamos and Pueblo Canyons, within the townsite of Los Alamos and nearby lands in Los Alamos County (includes lands managed by Department of Energy and the Santa Fe National Forest).

Scale: 1:24000, 2-3/8 inches to the mile.



Figure 11.--Douglas-fir and true fir mortality in Pueblo Canyon, Los Alamos, New Mexico, 1979.

FOREST INSECT AND DISEASE

PAGE

SURVEY SUMMARY

19 FEB 80

POPULATION STAND TABLE
OVERSTORY BEAR CANYON

HOST SPECIES IS DOUG-FIR

THE PEST IS TUSSOCK MOTH

THE METHOD OF SAMPLING WAS VARIABLE THE FIGURES IN THIS TABLE ARE BASED ON A SAMPLE OF 18 PLOTS, AND
REPRESENT AN AREA OF 130 ACRES.

BAF WAS 20.

THIS TABLE ONLY INCLUDES HOST TREES
NUMBERS OF TREES
PER ACRE

DBH	DOUGFIR LIVE	DEAD DOUGFIR	TOPKILL DF	TOPKILL&DEAD	PERCENT	TOTAL	PERCENTILE
5.0- 5.9	.000	13.523	.000	.000	100,000	13.523	42.616
6.0- 6.9	.000	4.538	.000	.000	100,000	4.538	14.302
10.0- 10.9	.000	3.630	.000	.000	100,000	3.630	11.440
11.0- 11.9	1.684	1.684	.000	.000	50,000	3.367	10.612
12.0- 12.9	.000	1.304	.000	.000	100,000	1.304	4.109
14.0- 14.9	.000	2.079	.000	.000	100,000	2.079	6.551
15.0- 15.9	.000	.848	.000	.000	100,000	.848	2.672
16.0- 16.9	.000	.796	.000	.000	100,000	.796	2.508
18.0- 18.9	.000	1.230	.000	.000	100,000	1.230	3.878
25.0- 25.9	.000	.313	.000	.000	100,000	.313	.987
44.0- 44.9	.000	.103	.000	.000	100,000	.103	.324
TOTAL	1.68	30.05	.00	.00	30.05	94.69	31.73
PERCENT	5.31	94.69	.00	.00	94.69		100.00

AVERAGE DIAMETER FOR HOST TREES

DOUGFIR LIVE	DEAD DOUGFIR	TOPKILL DF	TOPKILL&DEAD	TOTAL
11.0000	15.2200	.0000	.0000	15.2200

FOREST INSECT AND DISEASE

SURVEY SUMMARY

19 FEB 80

STATISTICAL ANALYSIS FOR HOST TREES

OVERSTORY REAR CANYON

AVE. NO. OF TREES PER ACRE	STANDARD DEVIATION	STANDARD ERROR	COEFFICIENT OF VARIATION	ESTIMATED NO. OF TREES	
				LOWER LIMIT	UPPER LIMIT
DOUGFIR LIVE	1.68362	.71430114+01	.16836239+01	424.26406	.19371510-05 .43774222+03
DEAD DOUGFIR	30.04731	.54357635+02	.12812217+02	180.90682	.22405622+04 .55717387+04
TOPKILL DF	.00000	.00000000	.00000000	.00000	.00000000 .00000000
	.00000	.00000000	.00000000	.00000	.00000000 .00000000
TOPKILL&DEAD	30.04731	.54357635+02	.12812217+02	180.90682	.22405622+04 .55717387+04
TOTAL	31.73094	.58958958+02	.13896760+02	185.80907	.23184428+04 .59316003+04

SURVEY SUMMARY

20 FEB 80

POPULATION STAND TABLE

BEAR CANYON OVERSTORY

HOST SPECIES IS TRUE FIRS

THE PEST IS TUSSOCK MOTH

THE METHOD OF SAMPLING WAS VARIABLE THE FIGURES IN THIS TABLE ARE BASED ON A SAMPLE OF 18 PLOTS, AND
 REPRESENT AN AREA OF 130 ACRES.

BAF WAS 20.

THIS TABLE ONLY INCLUDES HOST TREES
 NUMBERS OF TREES
 PER ACRE

DBH	TRUEFIR	LIVE	DEAD	TRUEFIR	TOPKILL	TF	PERCENT	TOTAL	PERCENTILE
5.0- 5.9		.000		37,862		.000	37,862	100,000	37,862
6.0- 6.9		.000		10,599		.000	10,599	100,000	10,599
7.0- 7.9		.000		10,738		.000	10,738	100,000	10,738
8.0- 8.9		.000		5,987		.000	5,987	100,000	5,987
9.0- 9.9		.000		16,384		.000	16,384	100,000	16,384
10.0- 10.9		.000		9,798		.000	9,798	100,000	9,798
11.0- 11.9		.000		6,013		.000	6,013	100,000	6,013
12.0- 12.9		.000		4,087		.000	4,087	100,000	4,087
13.0- 13.9		.000		3,377		.000	3,377	100,000	3,377
14.0- 14.9		.000		2,008		.000	2,008	100,000	2,008
17.0- 17.9		.000		.650		.000	.650	100,000	.650
19.0- 19.9		.000		1,077		.000	1,077	100,000	1,077
21.0- 21.9		.000		.449		.000	.449	100,000	.449
29.0- 29.9		.000		.242		.000	.242	100,000	.242
32.0- 32.9		.000		.199		.000	.199	100,000	.199
33.0- 33.9		.000		.183		.000	.183	100,000	.183
35.0- 35.9		.000		.162		.000	.162	100,000	.162
38.0- 38.9		.000		.271		.000	.271	100,000	.271
39.0- 39.9		.000		.133		.000	.133	100,000	.133
41.0- 41.9		.000		.121		.000	.121	100,000	.121
46.0- 46.9		.000		.095		.000	.095	100,000	.095
TOTAL		.00		110.44		.00	110.44	100.00	110.44
PERCENT		.00		100.00		.00	100.00		100.00

 * .0000 15.4714 .0000 .0000 15.4714 15.4714 *
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STATISTICAL ANALYSIS FOR HOST TREES

REAR CANYON OVERSTORY

AVE. NO. OF TREES PER ACRE	STANDARD DEVIATION	STANDARD ERROR	COEFFICIENT OF VARIATION	ESTIMATED NO. OF TREES	LOWER LIMIT	UPPER LIMIT
TRUEFIR LIVE	.00000	.00000000	.00000000	.00000	.00000000	.00000000
DEAD TRUEFIR	110.43506	.14809234+03	.34905699+02	134.09902	.98188175+04	.18894299+05
TOPKILL TF	.00000	.00000000	.00000000	.00000	.00000000	.00000000
	.00000	.00000000	.00000000	.00000	.00000000	.00000000
	110.43506	.14809234+03	.34905699+02	134.09902	.98188175+04	.18894299+05
TOTAL	110.43506	.14809234+03	.34905699+02	134.09902	.98188175+04	.18894299+05

FOREST INSECT AND DISEASE

PAGE 1

SURVEY SUMMARY

19 FEB 80

POPULATION STAND TABLE

BEAR CANYON OVERSTORY

HOST SPECIES IS TRUE FIRS

THE PEST IS TUSsock MOTH

THE METHOD OF SAMPLING WAS VARIABLE THE FIGURES IN THIS TABLE ARE BASED ON A SAMPLE OF 18 PLOTS, AND
 REPRESENT AN AREA OF 130. ACRES.

BAF WAS 20.

THIS TABLE ONLY INCLUDES NON-HOST TREES

NUMBERS OF TREES

PER ACRE

DBH	POND PINE	WHITE PINE	OTHER	TOTAL	PERCENTILE
21.0 - 21.9	.453	.000	.000	.453	34.756
24.0 - 24.9	.339	.000	.000	.339	26.024
28.0 - 28.9	.251	.000	.000	.251	19.231
36.0 - 36.9	.155	.000	.000	.155	11.920
44.0 - 44.9	.105	.000	.000	.105	8.069
TOTAL	1.30	.00	.00	1.30	100.00
PERCENT	100.00	.00	.00	100.00	

AVERAGE DIAMETER FOR NON-HOST TREES

	POND PINE	WHITE PINE	OTHER	TOTAL	
*	30.8800	.0000	.0000	.0000	30.8800

FOREST INSECT AND DISEASE

SURVEY SUMMARY

19 FEB 80

STATISTICAL ANALYSIS FOR NON-HOST TREES

HEAR CANYON OVERSTORY

AVE. NO. OF TREES PER ACRE	STANDARD DEVIATION	STANDARD ERROR	COEFFICIENT OF VARIATION	ESTIMATED NO. OF TREES	LOWER LIMIT	UPPER LIMIT
POND PINE 1,30415	.24860978+01	.58597886+00	190.62923	.93362700+02	.24571720+03	
WHITE PINE .00000	.00000000	.00000000	.00000	.00000000	.00000000	
	.00000	.00000000	.00000000	.00000	.00000000	.00000000
OTHER .00000	.00000000	.00000000	.00000	.00000000	.00000000	
TOTAL 1,30415	.24860978+01	.58597886+00	190.62923	.93362700+02	.24571720+03	

SURVEY SUMMARY

22 FEB 80

POPULATION STAND TABLE

REGEN BEAR CANYON

HOST SPECIES IS DOUGLAS FIR

THE PEST IS TUSsock MOTH

THE METHOD OF SAMPLING WAS FIXED

THE FIGURES IN THIS TABLE ARE BASED ON A SAMPLE OF 18 PLUTS, AND

REPRESENT AN AREA OF 130 ACRES.

PLOT SIZE = .010 ACRES

THIS TABLE ONLY INCLUDES HOST TREES

NUMBERS OF TREES

PER ACRE

DBH	DOUGFIR	LIVE	DEAD	DOUGFIR	TOPKILL	DF	DEAD&TOPKILL	PERCENT	TOTAL	PERCENTILE
.4-	.9	.000	5.556	.000	.000	5.556	100.000	5.556	25.000	
1.0-	1.9	.000	5.556	.000	.000	5.556	100.000	5.556	25.000	
2.0-	2.9	.000	5.556	.000	.000	5.556	100.000	5.556	25.000	
4.0-	4.9	.000	5.556	.000	.000	5.556	100.000	5.556	25.000	
<hr/>										
TOTAL		.00	22.22	.00	.00	22.22	100.00	22.22	100.00	
<hr/>										
PERCENT		.00	100.00	.00	.00	100.00				

AVERAGE DIAMETER FOR HOIST TREES

DOUGFIR LIVE	DEAD DOUGFIR	TOPKILL DF	DEAD&TOPKILL	TOTAL
0000	2,4250	0000	0000	2,4250

FOREST INSECT AND DISEASE

PAGE 1

SURVEY SUMMARY
20 FEB 60POPULATION STAND TABLE
GENERATION BEAR CANYON
HOST SPECIES IS TRUE FIRS

THE PEST IS TUSsock MOTH

THE METHOD OF SAMPLING WAS FIXED & THE FIGURES IN THIS TABLE ARE BASED ON A SAMPLE OF 18 PLOTS, AND
REPRESENT AN AREA OF 130. ACRES.

PLOT SIZE = .010 ACRES.

THIS TABLE ONLY INCLUDES HOST TREES

NUMBERS OF TREES

PER ACRE

DBH	TRUEFIR LIVE	DEADTRUE FIR	TOPKILL TF	DEAD&TOPKILL	PERCENT	TOTAL	PERCENTILE
.4- .9	.000	88.889	.000	88.889	100.000	88.889	32.653
1.0- 1.9	.000	77.778	.000	77.778	100.000	77.778	28.571
2.0- 2.9	.000	50.000	.000	50.000	100.000	50.000	18.367
3.0- 3.9	.000	44.444	.000	44.444	100.000	44.444	16.327
4.0- 4.9	.000	11.111	.000	11.111	100.000	11.111	4.082
TOTAL	.00	272.22	.00	272.22	100.00	272.22	100.00
PERCENT	.00	100.00	.00	100.00			

AVERAGE DIAMETER FOR HOST TREES

TRUEFIR LIVE	DEADTRUE FIR	TOPKILL TF	DEAD&TOPKILL	TOTAL
.0000	1.8633	.0000	.0000	1.8633

FOREST INSECT AND DISEASE

PAGE 1

SURVEY SUMMARY

20 FEB 80

PUPULATION STAND TABLE
EGENERATION PER CANYON
HOST SPECIES IS TRUE FIRS

THE PEST IS TUSSOCK MOTH

THE METHOD OF SAMPLING WAS FIXED SO THAT THE FIGURES IN THIS TABLE ARE BASED ON A SAMPLE OF 18 PLOTS, AND

REPRESENT AN AREA OF 130. ACRES.

PLOT SIZE = .010 ACRES.

THIS TABLE ONLY INCLUDES NON-HOST TREES

NUMBERS OF TREES

PER ACRE

DRH	PONDEROSA P.	WHITE PINE	OTHER	TOTAL	PERCENTILE	
4.0 - 4.9	11.111	.000	.000	.000	11.111	100.00
TOTAL	11.11	.00	.00	.00	11.11	100.0
PERCENT	100.00	.00	.00	.00	100.00	

AVERAGE DIAMETER FOR NON-HOST TREES

PONDEROSA P.	WHITE PINE	OTHER	TOTAL
4,4500	0000	0000	0000

FOREST INSECT AND DISEASE

PAGE

SURVEY SUMMARY

20 FEB 80

POPULATION STAND TABLE

OVERSTORY MEDIAN DIA. CAN

HOST SPECIES IS DOUG-FIR

THE PEST IS TUSSOCK MOTH

THE METHOD OF SAMPLING WAS VARIABLE THE FIGURES IN THIS TABLE ARE BASED ON A SAMPLE OF 20 PLOTS, AND
 REPRESENT AN AREA OF 125 ACRES.

BAF WAS 20.

THIS TABLE ONLY INCLUDES HOST TREES

NUMBERS OF TREES

PER ACRE

DBH	DOUGFIR LIVE	DEAD DOUGFIR	TOPKILL OF	DEAD&TOPKILL	PERCENT	TOTAL	PERCENTILE
5.0- 5.9	.000	5.267	12.815	.000	18.082	100.000	18.082
6.0- 6.9	.000	10.186	.000	.000	10.186	100.000	10.186
7.0- 7.9	3.348	.000	.000	.000	.000	.000	3.348
8.0- 8.9	2.538	5.344	.000	.000	5.344	67.802	7.881
16.0- 16.9	.000	1.366	.000	.000	1.366	100.000	1.366
17.0- 17.9	.634	.599	.000	.000	.599	48.551	1.233
18.0- 18.9	.000	.519	.000	.000	.519	100.000	.519
22.0- 22.9	.000	.000	.353	.000	.353	100.000	.353
24.0- 24.9	.000	.000	.301	.000	.301	100.000	.301
25.0- 25.9	.000	.000	.293	.000	.293	100.000	.293
26.0- 26.9	.000	.259	.530	.000	.789	100.000	.789
27.0- 27.9	.000	.241	.000	.000	.241	100.000	.241
28.0- 28.9	.000	.234	.000	.000	.234	100.000	.234
30.0- 30.9	.000	.193	.000	.000	.193	100.000	.193
32.0- 32.9	.177	.177	.000	.000	.177	50.000	.354
33.0- 33.9	.000	.000	.166	.000	.166	100.000	.166
36.0- 36.9	.000	.000	.138	.000	.138	100.000	.138
TOTAL	6.70	24.38	14.60	.00	38.98	85.34	45.68
PERCENT	14.66	53.38	31.95	.00	85.34		100.00

AVERAGE DIAMETER FOR HOST TREES

DOUGFIR LIVE	DEAD DOUGFIR	TOPKILL OF	DEAD&TOPKILL	TOTAL
16.2750	17.7714	22.8333	.0000	19.7522

FOREST INSECT AND DISEASE

SURVEY SUMMARY

20 FEB 80

STATISTICAL ANALYSIS FOR HOST TREES

OVERSTORY MEDIO DIA CAN

AVE. NO. OF TREES PER ACRE	STANDARD DEVIATION	STANDARD ERROR	COEFFICIENT OF VARIATION	ESTIMATED NO. OF TREES	LOWER LIMIT	UPPER LIMIT
DOUGFIR LIVE	6.69711	.18262017+02	.40835111+01	272.68523	.32669925+03	.13475770+04
DEAD DOUGFIR	24.38380	.71025109+02	.15881697+02	291.27986	.10627633+04	.50331876+04
TOPKILL DF	14.59543	.38976417+02	.87153916+01	267.04543	.73500420+03	.29138521+04
	.00000	.00000000	.00000000	.00000	.00000000	.00000000
DEAD&TOPKILL	38.97923	.76463147+02	.17097679+02	196.16383	.27351937+04	.70096134+04
TOTAL	45.67633	.82113770+02	.18361197+02	179.77312	.34143920+04	.80046912+04

FOREST INSECT AND DISEASE

PAGE 2

SURVEY SUMMARY
20 FEB 80POPULATION STAND TABLE
OVERSTORY MEDIO DIA CAN
HOST SPECIES IS TRUE FIR

THE PEST IS TUSSOCK MOTH

THE METHOD OF SAMPLING WAS VARIABLE THE FIGURES IN THIS TABLE ARE BASED ON A SAMPLE OF 20 PLOTS, AND
REPRESENT AN AREA OF 125. ACRES.

BAF WAS 20.

THIS TABLE ONLY INCLUDES HOST TREES
SQ. FT. OF BASAL AREA
PER ACRE

DBH	TRUEFIR	LIVE	DEAD	TRUEFIR	TOPKILL	TF	DEAD & TOPKILL	PERCENT	TOTAL	PERCENTILE
5.0- 5.9		1.000		2.000		.000	.000	2.000	66.667	3.000
6.0- 6.9		.000		2.000		.000	.000	2.000	100.000	2.000
7.0- 7.9		1.000		1.000		.000	.000	1.000	50.000	2.000
8.0- 9.9		1.000		.000		.000	.000	.000	.000	1.000
10.0- 10.9		.000		.000		1.000		1.000	100.000	1.000
12.0- 12.9		1.000		.000		1.000		1.000	50.000	2.000
14.0- 14.9		.000		1.000		1.000		2.000	100.000	2.000
15.0- 15.9		.000		2.000		.000	.000	2.000	100.000	2.000
16.0- 16.9		1.000		1.000		1.000		2.000	66.667	3.000
17.0- 17.9		.000		1.000		1.000		2.000	100.000	2.000
18.0- 18.9		.000		1.000		.000	.000	1.000	100.000	1.000
20.0- 20.9		.000		.000		2.000		2.000	100.000	2.000
21.0- 21.9		1.000		2.000		1.000		3.000	75.000	4.000
23.0- 23.9		.000		1.000		.000	.000	1.000	100.000	1.000
24.0- 24.9		.000		1.000		.000	.000	1.000	100.000	1.000
26.0- 26.9		.000		1.000		1.000		2.000	100.000	2.000
27.0- 27.9		.000		1.000		.000	.000	1.000	100.000	1.000
31.0- 31.9		.000		.000		1.000		1.000	100.000	1.000
32.0- 32.9		.000		.000		1.000		1.000	100.000	1.000
33.0- 33.9		.000		1.000		.000	.000	1.000	100.000	1.000
<hr/>										
TOTAL		6.00		18.00		11.00		.00	29.00	82.86
<hr/>										
PERCENT		17.14		51.43		31.43		.00	82.86	

SURVEY SUM

20 FEB 4

POPULATION STAND TABLE
OVERSTORY MEDIUM DIA CAN
HOST SPECIES IS TRUE FIR

THE PEST IS TUSSOCK MOTH

THE METHOD OF SAMPLING WAS VARIABLE THE FIGURES IN THIS TABLE ARE BASED ON A SAMPLE OF 20 PLOTS, AND
REPRESENT AN AREA OF 125 ACRES.

BAF WAS 20.

THIS TABLE ONLY INCLUDES HOST TREES

NUMBERS OF TREES

PER ACRE

DHH	TRUEFIR	LIVE	DEAD	TRUEFIR	TOPKILL	TF	DEAD & TOPKILL	PERCENT	TOTAL	PERCENTILE
5.0- 5.9	5.267	14,668	.000	.000	14,668	.000	73,579	19.935	36,837	
6.0- 6.9	.000	10,186	.000	.000	10,186	.000	100,000	10,186	18,823	
7.0- 7.9	3.259	2,938	.000	.000	2,938	.000	47,404	6.197	11,452	
8.0- 8.9	2,264	.000	.000	.000	.000	.000	.000	2,264	4,183	
10.0- 10.9	.000	.000	1,663	.000	1,663	.000	100,000	1,663	5,073	
12.0- 12.9	1,173	.000	1,119	.000	1,119	.000	48,814	2,292	4,236	
14.0- 14.9	.000	.922	.848	.000	1,771	.000	100,000	1,771	3,272	
15.0- 15.9	.000	1,507	.000	.000	1,507	.000	100,000	1,507	2,785	
16.0- 16.9	.665	.716	.690	.000	1,406	.000	67,882	2,072	3,828	
17.0- 17.9	.000	.620	.579	.000	1,198	.000	100,000	1,198	2,215	
18.0- 18.9	.000	.566	.000	.000	.566	.000	100,000	.566	1,046	
20.0- 20.9	.000	.000	.882	.000	.882	.000	100,000	.882	1,630	
21.0- 21.9	.416	.832	.382	.000	1,214	.000	74,487	1,630	3,011	
23.0- 23.9	.000	.335	.000	.000	.335	.000	100,000	.335	.619	
24.0- 24.9	.000	.305	.000	.000	.305	.000	100,000	.305	.564	
26.0- 26.9	.000	.271	.271	.000	.542	.000	100,000	.542	1,002	
27.0- 27.9	.000	.237	.000	.000	.237	.000	100,000	.237	.438	
31.0- 31.9	.000	.000	.186	.000	.186	.000	100,000	.186	.344	
32.0- 32.9	.000	.000	.179	.000	.179	.000	100,000	.179	.331	
33.0- 33.9	.000	.168	.000	.000	.168	.000	100,000	.168	.311	
TOTAL	13,04	34,27	6,80	.00	41,07	.00	75,89	54,12	100,00	
PERCENT	24.11	63.33	12.57	.00	75.89	.00				

AVERAGE DIAMETER FOR HUST TREES

* TRUEFIR LIVE DEAD TRUEFIR TOPKILL TF

DEAD&TOPKILL

TOTAL

12.0833 10.8389 20.3818 .0000 18.1828 17.1371

STATISTICAL ANALYSIS FOR HOST TREES
OVERSTORY MEDIO DIA CAN

AVE. NO. OF TREES PER ACRE	STANDARD DEVIATION	STANDARD ERROR	COEFFICIENT OF VARIATION	ESTIMATED NO. OF TREES	LOWER LIMIT	UPPER LIMIT
TRUEFIR LIVE	13.04463	.36514361+02	.81648594+01	279.91863	.60997180+03	.26511866+04
DEAD TRUEFIR	34.27108	.11054872+03	.24719446+02	322.57141	.11939549+04	.73738163+04
TOPKILL TF	6.79996	.13878564+02	.31033412+01	204.09786	.46207680+03	.12379121+04
	.00000	.00000000	.00000000	.00000	.00000000	.00000000
DEAD&TOPKILL	41.07104	.10940221+03	.24463078+02	266.37312	.20759952+04	.81917647+04
TOTAL	54.11567	.11129420+03	.24886139+02	205.65981	.36536919+04	.98752264+04

SURVEY SUMM

20 FEB 80

POPULATION STAND TABLE
OVERSTORY MEDIAN DIA CAN
HOST SPECIES IS DOUG-FIR

THE PEST IS TUSsock MOTH

THE METHOD OF SAMPLING WAS VARIABLE THE FIGURES IN THIS TABLE ARE BASED ON A SAMPLE OF 20 PLOTS, AND
REPRESENT AN AREA OF 125 ACRES.

BAF WAS 20.

THIS TABLE ONLY INCLUDES NON-HOST TREES

NUMBERS OF TREES
PER ACRE

DBH	PONDEROSA P. WHITE PINE	OTHER	TOTAL	PERCENTILE
5.0- 5.9	7,334	.000	.000	17,920
7.0- 7.9	3,637	.000	.000	8,887
8.0- 8.9	5,179	2,315	.000	18,311
9.0- 9.9	8,634	.000	.000	21,095
11.0- 11.9	1,295	.000	.000	3,164
12.0- 12.9	2,546	.000	.000	6,222
13.0- 13.9	1,006	.000	.000	2,458
15.0- 15.9	783	.000	.000	1,914
16.0- 16.9	650	.000	.000	1,587
17.0- 17.9	1,839	.000	.000	4,493
18.0- 18.9	513	.000	.000	1,254
19.0- 19.9	950	.000	.000	2,321
20.0- 20.9	1,344	.000	.000	3,285
22.0- 22.9	.715	.000	.000	1,747
23.0- 23.9	.347	.000	.000	.847
24.0- 24.9	.303	.318	.000	1,518
27.0- 27.9	.492	.000	.000	1,203
29.0- 29.9	.214	.000	.000	.522
31.0- 31.9	.182	.000	.000	.446
33.0- 33.9	.331	.000	.000	.808
TOTAL	38.29	2.63	.00	40.93
PERCENT	93.57	6.43	.00	100.00

AVERAGE DIAMETER FOR NON-HOST TREES

PONDEROSA P. WHITE PINE

OTHER

TOTAL

17.9788

16.4500

.0000

.0000

17.8914

20 FEB 80

STATISTICAL ANALYSIS FOR NON-HOST TREES

OVERSTORY MEDIO DIA CAN

AVE. NO. OF TREES PER ACRE	STANDARD DEVIATION	STANDARD ERROR	COEFFICIENT OF VARIATION	ESTIMATED NO. OF TREES	LOWER LIMIT	UPPER LIMIT
PUNTERUSA P.	.46980707+02	.10505206+02	122.68628	.34735203+04	.34735203+04	.60998216+04
WHITE PINE	.11775138+02	.26330008+01	447.21359	.37252903-05	.37252903-05	.65825019+03
	.00000	.00000000	.00000000	.00000	.00000000	.00000000
OTHER	.00000	.00000000	.00000000	.00000	.00000000	.00000000
TOTAL	.46190632+02	.10328539+02	112.86277	.38247286+04	.38247286+04	.64068635+04

FOREST INSECT AND DISEASE

PAGE 1

SURVEY SUMMARY

21 FEB 80

POPULATION STAND TABLE

GEN. MEDIO RÍA CANYON

HOST SPECIES IS DOUGLAS FIR

THE PEST IS TUSSOCK MOTH

THE METHOD OF SAMPLING WAS FIXED RE THE FIGURES IN THIS TABLE ARE BASED ON A SAMPLE OF 20 PLOTS, AND
REPRESENT AN AREA OF 125 ACRES.

PLOT SIZE = .010 ACRES.

THIS TABLE ONLY INCLUDES HOST TREES

NUMBERS OF TREES

P F R A C R E

DBH	DOUG FIR	LIVE	DEAD	DOUG FIR	TOPKILL	DF	DEAD & TOPKILL	PERCENT	TOTAL	PERCENTILE
.4-	.9	40,000	25,000	15,000	.000	40,000	50,000	80,000	37,20	
1.0-	1.9	15,000	30,000	.000	.000	30,000	66,667	45,000	20,93	
2.0-	2.9	10,000	20,000	5,000	.000	25,000	71,429	35,000	16,27	
3.0-	3.9	.000	20,000	5,000	.000	25,000	100,000	25,000	11,62	
4.0-	4.9	.000	15,000	5,000	.000	20,000	100,000	20,000	9,30	
<hr/>										
TOTAL		75,00	110,00	30,00	.00	140,00	65.12	215,00	100,00	
<hr/>										
PERCENT		34.88	51.16	13.95	.00	65.12				

AVERAGE DIAMETER FOR HOST TREES

DOUGFIR LIVE	DEAD DOUGFIR	TOPKILL DF	DEAD&TOPKILL	TOTAL	
1.1133	2.1955	2.1000	.0000	2.1750	1.8047

FOREST INSECT AND DISEASE

PAGE 1

SURVEY SUMMARY
20 FFB 80

POPULATION STAND TABLE

GEN. MEDIUM DIA CANYON

HOST SPECIES IS TRUE FIRS

THE PEST IS TUSSOCK MOTH

THE METHOD OF SAMPLING WAS FIXED RE THE FIGURES IN THIS TABLE ARE BASED ON A SAMPLE OF 20 PLOTS, AND
REPRESENT AN AREA OF 125 ACRES.

PLOT SIZE = .010 ACRES.

THIS TABLE ONLY INCLUDES HOST TREES

NUMBERS OF TREES

PER ACRE

DBH TRUEFIR LIVE DEAD TRUEFIR TOPKILL TF PERCENT TOTAL PERCENTILE

.4- .9	20,000	50,000	.000	.000	50,000	71.429	70,000	38,889
1.0- 1.9	35,000	15,000	5,000	.000	20,000	36.364	55,000	30,556
2.0- 2.9	.000	20,000	.000	.000	20,000	100,000	20,000	11.111
3.0- 3.9	10,000	5,000	5,000	.000	10,000	50,000	20,000	11.111
4.0- 4.9	15,000	.000	.000	.000	.000	.000	15,000	8,333

TOTAL	80,00	90,00	10,00	.00	100,00	55.56	180,00	100,00
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PERCENT	44.44	50.00	5.56	.00	55.56			
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AVERAGE DIAMETER FOR HOST TREES

TRUEFIR LIVE	DEAD TRUEFIR	TOPKILL	TF	TOTAL	
2.1312	1.4778	2.4500	.0000	1.5750	1.8222

FOREST INSECT AND DISEASE

PAGE 1

SURVEY SUMMARY
20 FEB 80

POPULATION STAND TABLE
GEN. MEDIAN DIA CANYON
HOST SPECIES IS TRUE FIRS

THE PEST IS TUSSOCK MOTH

THE METHOD OF SAMPLING WAS FIXED RE THE FIGURES IN THIS TABLE ARE BASED ON A SAMPLE OF 20 PLOTS, AND
REPRESENT AN AREA OF 125 ACRES.

PLOT SIZE = .010 ACRES.

THIS TABLE ONLY INCLUDES NON-HOST TREES

NUMBERS OF TREES

PER ACRE

DBH	PONDEROSA P.	WHITE PINE	OTHER	TOTAL	PERCENTILE	
.4- .9	10,000	55,000	.000	.000	15,000	25.00
1.0- 1.9	5,000	.000	.000	.000	5,000	8.33
2.0- 2.9	5,000	.000	.000	.000	5,000	8.33
3.0- 3.9	15,000	.000	.000	.000	15,000	25.00
4.0- 4.9	20,000	.000	.000	.000	20,000	33.33
TOTAL	55,000	5,000	.00	.00	60,000	100.00
PERCENT	91.67	8.33	.00	.00	100.00	

AVERAGE DIAMETER FOR NON-HOST TREES

PONDEROSA P.	WHITE PINE	OTHER	TOTAL	
2,8727	.9000	.0000	.0000	2.79

FOREST INSECT AND DISEASE

PAGE 1

SURVEY SUMMARY

21 FEB 80

POPULATION STAND TABLE

OVERSTORY LA CANYON

HOST SPECIES IS DOUG-FIR

THE PEST IS TUSSOCK MOTH

THE METHOD OF SAMPLING WAS VARIABLE. THE FIGURES IN THIS TABLE ARE BASED ON A SAMPLE OF 15 PLOTS, AND
 REPRESENT AN AREA OF 50. ACRES.

BAF WAS 20.

THIS TABLE ONLY INCLUDES HOST TREES

NUMBERS OF TREES

PER ACRE

DBH	DOUGFIR LIVE	DEAD DOUGFIR	TOPKILL DF	DEAD&TOPKILL	PERCENT	TOTAL	PERCENTILE
5.0- 5.9	.000	31.953	16.666	.000	48.618	100.000	48.618 32.902
6.0- 6.9	.000	28.133	6.360	.000	34.492	100.000	34.492 23.342
7.0- 7.9	9.180	18.070	.000	.000	18.070	66.312	27.250 18.441
8.0- 8.9	7.013	10.509	3.636	.000	14.144	66.852	21.152 14.318
9.0- 9.9	.000	5.715	2.952	.000	8.667	100.000	8.667 5.865
10.0- 10.9	.000	2.445	.000	.000	2.445	100.000	2.445 1.654
12.0- 12.9	.000	1.698	.000	.000	1.698	100.000	1.698 1.149
15.0- 15.9	.000	2.025	.000	.000	2.025	100.000	2.025 1.370
16.0- 16.9	.000	.920	.000	.000	.920	100.000	.920 .623
22.0- 22.9	.000	.496	.000	.000	.496	100.000	.496 .336
TOTAL	16.19	101.96	29.61	.00	131.58	89.04	147.77 100.00
PERCENT	10.96	69.00	20.04	.00	89.04		

AVERAGE DIAMETER FOR HOST TREES

DOUGFIR LIVE	DEAD DOUGFIR	TOPKILL DF	DEAD&TOPKILL	TOTAL
7,8250	9,1667	6,8800	.0000	8,7724

FOREST INSECT AND DISEASE

SURVEY SUMMARY

21 FEB 80

STATISTICAL ANALYSIS FOR HOST TREES

OVERSTORY LA CANYON

AVE. NO. OF TREES PER ACRE	STANDARD DEVIATION	STANDARD ERROR	COEFFICIENT OF VARIATION	ESTIMATED NO. OF TREES	
				LOWER LIMIT	UPPER LIMIT
DOUGFIR LIVE	16.19314	.28143102+02	.72665178+01	173.79643	.44633119+03 .11729829+04
DEAD DOUGFIR	101.96195	.10773163+03	.27816186+02	105.65866	.37072880+04 .64889066+04
TOPKILL DF	29.61312	.68311823+02	.17638037+02	230.68096	.59875401+03 .23625576+04
	.00000	.00000000	.00000000	.00000	.00000000 .00000000
DEAD&TOPKILL	131.57506	.10924551+03	.28207069+02	83.02904	.51683997+04 .79891064+04
TOTAL	147.76820	.10800418+03	.27886560+02	73.09027	.59940820+04 .87827380+04

FOREST INSECT AND DISEASE

PAGE 1

SURVEY SUMMARY

21 FEB 80

POPULATION STAND TABLE
OVERSTORY LA CANYON

HOST SPECIES IS TRUE FIRS

THE PEST IS TUSSOCK MOTH

THE METHOD OF SAMPLING WAS VARIABLE THE FIGURES IN THIS TABLE ARE BASED ON A SAMPLE OF 15 PLOTS, AND
REPRESENT AN AREA OF 50 ACRES.

BAF WAS 20.

THIS TABLE ONLY INCLUDES HOST TREES
NUMBERS OF TREES
PER ACRE

DBH	TRUE FIR	DEAD TRUEFIR	TOPKILL TF	DEAD&TOPKILL	PERCENT	TOTAL	PERCENTILE
5.0- 5.9	15,048	14,818	.000	.000	14,818	49,614	29,867
6.0- 6.9	.000	.000	6,570	.000	6,570	100,000	6,570
7.0- 7.9	.000	8,364	.000	.000	8,364	100,000	8,364
TOTAL	15.05	23.18	6.57	.00	29.75	66,41	44.80
PERCENT	33.59	51.75	14.66	.00	66.41		100.00

AVERAGE DIAMETER FOR HOST TREES

TRUE FIR	DEAD TRUEFIR	TOPKILL TF	DEAD&TOPKILL	TOTAL
5.7000	6.7000	6.1000	.0000	6.5800

FOREST INSECT AND DISEASE

SURVEY SUMMARY

21 FEB 80

STATISTICAL ANALYSIS FOR HOST TREES

OVERSTORY LA CANYON

	AVE. NO. OF TREES PER ACRE	STANDARD DEVIATION	STANDARD ERROR	COEFFICIENT OF VARIATION	ESTIMATED NO. OF TREES	LOWER LIMIT	UPPER LIMIT
TRUE FIR	15.04846	.39712780±02	.10253796±02	263.89933	.23973311±03	.12651127±04	
DEAD TRUE FIR	23.18222	.59296985±02	.15310416±02	255.78649	.39359018±03	.19246317±04	
TOPKILL TF	6.56980	.25444720±02	.65697984±01	387.29832	.29802322±05	.65697983±03	
	.00000	.00000000	.00000000	.00000	.00000000	.00000000	
DEAD & TOPKILL	29.75202	.61945167±02	.15994173±02	208.20493	.68789220±03	.22873095±04	
TOTAL	44.80047	.66745070±02	.17233503±02	148.98295	.13783486±04	.31016989±04	

FOREST INSECT AND DISEASE

PAGE 1

SURVEY SUMMARY
21 FEB 80

POPULATION STAND TABLE

OVERS DRY LA CANYON

HOST SPECIES IS DOUG-FIR

THE PEST IS TUSSOCK MOTH

THE METHOD OF SAMPLING WAS VARIABLE THE FIGURES IN THIS TABLE ARE BASED ON A SAMPLE OF 15 PLOTS, AND
REPRESENT AN AREA OF 50 ACRES.

BAF WAS 20.

THIS TABLE ONLY INCLUDES NON-HOST TREES

NUMBERS OF TREES

PER ACRE

DBH	PONDEROSA P. WHITE PINE	OTHER	TOTAL	PERCENTILE
5.0- 5.9	9,041	17,045	.000	.000
10.0- 10.9	.000	2,217	.000	2,217
12.0- 12.9	2,984	.000	.000	2,984
17.0- 17.9	.000	.772	.000	.772
18.0- 18.9	.000	1,399	.000	1,399
20.0- 20.9	.582	.000	.000	.582
23.0- 23.9	.905	.000	.000	.905
25.0- 25.9	.367	.000	.000	.367
TOTAL	13,88	21,43	.00	.00
PERCENT	39.30	60.70	.00	.00

AVERAGE DIAMETER FOR NON-HOST TREES

PONDEROSA P. WHITE PINE	OTHER	TOTAL
17.6571	12.7500	.0000

FOREST INSECT AND DISEASE

SURVEY SUMMARY

21 FEB 80

STATISTICAL ANALYSIS FOR NON-HOST TREES

OVERSTORY LA CANYON

AVE. NO. OF TREES PER ACRE	STANDARD DEVIATION	STANDARD ERROR	COEFFICIENT OF VARIATION	ESTIMATED NO. OF TREES	
				LOWER LIMIT	UPPER LIMIT
PONDEROSA P.	13.87867	.34634529+02	.89425968+01	249.55218	.24680375+03 .11410634+04
WHITE PINE	21.43305	.52078993+02	.13446738+02	242.98452	.39931558+03 .17439894+04
	.00000	.00000000	.00000000	.00000	.00000000 .00000000
OTHER	.00000	.00000000	.00000000	.00000	.00000000 .00000000
TOTAL	35.31172	.57221962+02	.14774647+02	162.04806	.10268537+04 .25043184+04

FOREST INSECT AND DISEASE

PAGE 1

SURVEY SUMMARY

21 FEB 80

POPULATION STAND TABLE

GEN LA CANYON

HOST SPECIES IS DOUG-FIR

THE PEST IS TUSSOCK MOTH

THE METHOD OF SAMPLING WAS FIXED RE THE FIGURES IN THIS TABLE ARE BASED ON A SAMPLE OF 15 PLOTS, AND
REPRESENT AN AREA OF 50.ACRES.

PLOT SIZE = .010 ACRES.

THIS TABLE ONLY INCLUDES HOST TREES

NUMBERS OF TREES

PER ACRE

DBH	DOUGFIR	LIVE	DEAD	DOUGFIR	TOPKILL	DF	DEAD&TOPKILL	PERCENT	TOTAL	PERCENTILE
.4- .9		113,333		146,667		66,667	.000	213,333	65,306	326,667
1.0- 1.9		33,333		113,333		26,667	.000	140,000	80,769	173,333
2.0- 2.9		26,667		133,333		.000	.000	133,333	83,333	160,000
3.0- 3.9		6,667		60,000		6,667	.000	66,667	90,909	73,333
4.0- 4.9		.000		20,000		.000	.000	20,000	100,000	20,000
TOTAL		180,00		473,33		100,00	.00	573,33	76,11	753,33
PERCENT		23.89		62.83		13.27	.00	76.11		100,00

AVERAGE DIAMETER FOR HOST TREES

DOUGFIR	LIVE	DEAD	DOUGFIR	TOPKILL	DF	DEAD&TOPKILL	TOTAL
★	1,3111	1,8352	-----	1,0933	-----	.0000	1,7058

FOREST INSECT AND DISEASE

PAGE 1

SURVEY SUMMARY

21 FEB 80

POPULATION STAND TABLE
GEN LA CANYON

HOST SPECIES IS TRUE FIRS

THE PEST IS TUSsock MOTH

THE METHOD OF SAMPLING WAS FIXED RE THE FIGURES IN THIS TABLE ARE BASED ON A SAMPLE OF 15 PLOTS, AND
REPRESENT AN AREA OF 50. ACRES.

PLOT SIZE = .010 ACRES.

THIS TABLE ONLY INCLUDES HOST TREES

NUMBERS OF TREES
P.F.P. ACRE

DHH	TRUEFIR	LIVE	DEAD	TRUEFIR	TOPKILL	TF	PERCENT	TOTAL	PERCENTILE
.4- .9	6.667	.000		6.667	.000	6.667	49.998	13.334	28.572
1.0- 1.9	.000	.000		6.667	.000	6.667	99.995	6.667	14.286
2.0- 2.9	6.667	.000		6.667	.000	6.667	.002	6.667	14.286
3.0- 3.9	6.667	.000		6.667	.000	6.667	.002	6.667	14.286
4.0- 4.9	6.667	6.667		.000	.000	6.667	49.999	13.334	28.570
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
TOTAL	26.67	6.67	13.33	.00	20.00	42.86	46.67	100.00	
PERCENT	57.14	14.29	28.57	.00	42.86				

AVERAGE DIAMETER FOR HOST TREES

TRUEFIR	LIVE	DEAD	TRUEFIR	TOPKILL	TF		TOTAL	
2,1667		3,0500		2,2000		.0000	2,5400	2,2600

FOREST INSECT AND DISEASE

PAGE

1

SURVEY SUMMARY

21 FEB 80

POPULATION STAND TABLE

GFN LA CANYON

HOST SPECIES IS TRUE FIRS

THE PEST IS TUSSOCK MOTH

THE METHOD OF SAMPLING WAS FIXED RE THE FIGURES IN THIS TABLE ARE BASED ON A SAMPLE OF 15 PLOTS, AND
REPRESENT AN AREA OF 50 ACRES.

PLOT SIZE = .010 ACRES.

THIS TABLE ONLY INCLUDES NON-HOST TREES

NUMBERS OF TREES

PER ACRE

DBH	PONDEROSA P.	WHITE PINE	OTHER	TOTAL	PERCENTILE
.4-	.9	6,667	13,533	.000	.000
1.0-	1.9	.000	6,667	.000	.000
2.0-	2.9	6,667	.000	.000	.000
3.0-	4.9	6,667	.000	.000	.000
<hr/>					
TOTAL		20.00	20.00	.00	.00
<hr/>					
PERCENT		50.00	50.00	.00	.00
<hr/>					

AVERAGE DIAMETER FOR NON-HOST TREES.

PONDEROSA P.	WHITE PINE	OTHER	TOTAL
2.4000	1.2333	.0000	.0000

FOREST INSECT AND DISEASE

PAGE 1

SURVEY SUMMARY

21 FEB 80

POPULATION STAND TABLE

PUEBLO CANYON

HOST SPECIES IS DOUGLAS FIR

THE PEST IS TUSSOCK MOTH

THE METHOD OF SAMPLING WAS VARIABLE THE FIGURES IN THIS TABLE ARE BASED ON A SAMPLE OF 20 PLOTS, AND
 REPRESENT AN AREA OF 100. ACRES.

BAF WAS 20.

THIS TABLE ONLY INCLUDES HOST TREES
 NUMBERS OF TREES
 PER ACRE

DBH	DOUG FIR	DEAD DOUG FIR	TOPKILL DF	DEAD & TOPKL	PERCENT	TOTAL	PERCENTILE
5.0- 5.9	.000	6,288	.000	.000	6,288	100,000	6,288 25,280
6.0- 6.9	3,965	.000	.000	.000	.000	0,000	3,965 15,942
7.0- 7.9	.000	3,348	.000	.000	3,348	100,000	3,348 13,462
8.0- 8.9	.000	7,335	.000	.000	7,335	100,000	7,335 29,493
12.0- 12.9	.000	1,173	.000	.000	1,173	100,000	1,173 4,718
14.0- 14.9	.000	1,796	.000	.000	1,796	100,000	1,796 7,219
15.0- 15.9	.000	.773	.000	.000	.773	100,000	.773 3,108
30.0- 30.9	.000	.193	.000	.000	.193	100,000	.193 .777
TOTAL	3.97	20.91	.00	.00	20.91	84.06	24.87 100,00
PERCENT	15.94	84.06	.00	.00	84.06		

AVERAGE DIAMETER FOR HOST TREES

DOUG FIR	DEAD DOUG FIR	TOPKILL DF	DEAD & TOPKL	TOTAL
6,8000	12,6100	.0000	.0000	12,6100 12,0818

FOREST INSECT AND DISEASE

SURVEY SUMMARY

21 FEB 80

STATISTICAL ANALYSIS FOR HOST TREES

PUEBLO CANYON

	AVE. NO. OF TREES PER ACRE	STANDARD DEVIATION	STANDARD ERROR	COEFFICIENT OF VARIATION	ESTIMATED NO. OF TREES	
					LOWER LIMIT	UPPER LIMIT
DOUG FIR	3.96511	.17732507+02	.39651092+01	447.21359	.29802322-05	.79302183+03
DEAD DOUG FIR	20.90663	.32604252+02	.72905323+01	155.95171	.13616101+04	.28197165+04
TOPKILL DF	.00000	.00000000	.00000000	.00000	.00000000	.00000000
	.00000	.00000000	.00000000	.00000	.00000000	.00000000
DEAD & TOPKL	20.90663	.32604252+02	.72905323+01	155.95171	.13616101+04	.28197165+04
TOTAL	24.87174	.34683697+02	.77555104+01	139.45021	.17116232+04	.32627253+04

FOREST INSECT AND DISEASE

PAGE 1

SURVEY SUMMARY

21 FEB 80

POPULATION STAND TABLE

PUEBLO CANYON

HOST SPECIES IS TRUE FIRS

THE PEST IS TUSSOCK MOTH

THE METHOD OF SAMPLING WAS VARIABLE THE FIGURES IN THIS TABLE ARE BASED ON A SAMPLE OF 20 PLOTS, AND
 REPRESENT AN AREA OF 100 ACRES.

BAF WAS 20.

THIS TABLE ONLY INCLUDES HOST TREES
 NUMBERS OF TREES
 PER ACRE

DBH	LIVE TRUEFIR	DEAD TRUEFIR	TOPKILL	TFIR	PERCENT	TOTAL	PERCENTILE
6.0- 6.9	.000	14.229	.000	.000	14.229	100.000	14.229
7.0- 7.9	.000	7.279	.000	.000	7.279	100.000	7.279
11.0- 11.9	.000	1.363	.000	.000	1.363	100.000	1.363
13.0- 13.9	.000	1.970	.000	.000	1.970	100.000	1.970
17.0- 17.9	.000	.634	.000	.000	.634	100.000	.634
TOTAL	.00	25.47	.00	.00	25.47	100.00	25.47
PERCENT	.00	100.00	.00	.00	100.00		

AVERAGE DIAMETER FOR HOST TREES

LIVE TRUEFIR	DEAD TRUEFIR	TOPKILL	TFIR	TOTAL
.0000	9.8667	.0000	.0000	9.8667

FOREST INSECT AND DISEASE

SURVEY SUMMARY

21 FEB 80

STATISTICAL ANALYSIS FOR HOST TREES

PUFBLD CANYON

AVE. NO. OF TREES PER ACRE	STANDARD DEVIATION	STANDARD ERROR	COEFFICIENT OF VARIATION	ESTIMATED NO. OF TREES	LOWER LIMIT	UPPER LIMIT
LIVE TRUEFIR .00000	.00000000	.00000000	.00000	.00000000	.00000000	.00000000
DEAD TRUEFIR 25.47494	.61875111+02	.13835695+02	242.88619	.11639244+04	.39310634+04	
TOPKILL TFIR .00000	.00000000	.00000000	.00000	.00000000	.00000000	.00000000
	.00000	.00000000	.00000000	.00000	.00000000	.00000000
	25.47494	.61875111+02	.13835695+02	242.88619	.11639244+04	.39310634+04
TOTAL 25.47494	.61875111+02	.13835695+02	242.88619	.11639244+04	.39310634+04	

FOREST INSECT AND DISEASE

5 (PAGE

SURVEY SUMMARY

21 FEB 80

POPULATION STAND TABLE

PUEBLO CANYON

HOST SPECIES IS DOUGLAS FIR

THE PEST IS TUSsock MOTH

THE METHOD OF SAMPLING WAS VARIABLE. THE FIGURES IN THIS TABLE ARE BASED ON A SAMPLE OF 20 PLOTS. AND

REPRESENT AN AREA OF 100 ACRES.

BAF WAS 20

THIS TABLE ONLY INCLUDES NON-HOST TREES

NUMBERS OF TREES

PER ACRE

DBH	PUNDEROSA P. WHITE PINE	OTHER	TOTAL	PERCENTILE
5.0- 5.9	13.621	.000	.000	13.621
6.0- 6.9	27.388	.000	.000	27.388
7.0- 7.9	9.211	2.938	.000	12.149
8.0- 8.9	2.479	.000	.000	2.479
9.0- 9.9	4.156	.000	.000	4.156
10.0- 10.9	5.032	.000	.000	5.032
11.0- 11.9	4.195	.000	.000	4.195
12.0- 12.9	3.678	.000	.000	3.678
13.0- 13.9	3.095	1.085	.000	4.180
14.0- 14.9	4.317	.884	.000	5.201
15.0- 15.9	1.527	.000	.000	1.527
16.0- 16.9	1.989	.000	.000	1.989
17.0- 17.9	.613	.000	.579	1.191
18.0- 18.9	1.095	.000	.000	1.095
19.0- 19.9	.482	.000	.000	.482
20.0- 20.9	.441	.000	.000	.441
TOTAL	83.32	4.91	.00	88.80
PERCENT	93.82	5.53	.65	100.00

AVERAGE DIAMETER FOR NON-HOST TREES

PONDEROSA P.	WHITE PINE	OTHER	TOTAL	
11.9341	11.7667	.0000	17.8000	12.0533

FOREST INSECT AND DISEASE

SURVEY SUMMARY

21 FEB 80

STATISTICAL ANALYSIS FOR NON-HOST TREES

PUEBLO CANYON

AVE. NO. OF TREES PER ACRE	STANDARD DEVIATION	STANDARD ERROR	COEFFICIENT OF VARIATION	ESTIMATED NO. OF TREES	LOWER LIMIT	UPPER LIMIT
PONDEROSA P.	83.31905	.76777233+02	.17167911+02	92.14847	.66151138+04	.10048696+05
WHITE PINE	4.90686	.14056620+02	.31431558+01	286.46856	.17637072+03	.80500188+03
	.00000	.00000000	.00000000	.00000	.00000000	.00000000
OTHER	57867	.25879028+01	.57867266+00	447.21359	.74505806+06	.11573453+03
TOTAL	88.80458	.74983937+02	.16766918+02	84.43701	.72037667+04	.10557150+05

-25-

FOREST INSECT AND DISEASE

PAGE 1

SURVEY SUMMARY

21 FEB 80

POPULATION STAND TABLE

PUEBLO CANYON

HOST SPECIES IS DOUGLAS FIR

THE PEST IS TUSsock MOTH

THE METHOD OF SAMPLING WAS FIXEDREG THE FIGURES IN THIS TABLE ARE BASED ON A SAMPLE OF 20 PLOTS, AND
 REPRESENT AN AREA OF 100.ACRES.

PLOT SIZE = .010 ACRES.

THIS TABLE ONLY INCLUDES HOST TREES

NUMBERS OF TREES

PER ACRE

DBH	DOUGFIR	LIVE	DEAD	DOUGFIR	TOPKILL	DOUG	PERCENT	TOTAL	PERCENTILE
.4- .9		35,000		25,000		5,000	.000	30,000	46,154
1.0- 1.9		5,000		15,000		25,000	.000	40,000	88,889
2.0- 2.9		0,000		15,000		5,000	.000	20,000	100,000
3.0- 3.9		10,000		15,000		5,000	.000	20,000	66,667
TOTAL		50,00		70,00		40,00	.00	110,00	68,75
PERCENT		31.25		43.75		25.00	.00	160,00	100,00

AVERAGE DIAMETER FOR HOST TREES

DOUGFIR	LIVE	DEAD	DOUGFIR	TOPKILL	DOUG	TOTAL
*	1.4400		1.8143		1.8375	.0000

FOREST INSECT AND DISEASE

PAGE 1

SURVEY SUMMARY

21 FEB 80

POPULATION STAND TABLE

PUEBLO CANYON

HOST SPECIES IS TRUE FIRS

THE PEST IS TUSSOCK MOTH

THE METHOD OF SAMPLING WAS FIXEDREG THE FIGURES IN THIS TABLE ARE BASED ON A SAMPLE OF 20 PLOTS, AND
 REPRESENT AN AREA OF 100.ACRES.

PLOT SIZE = .010 ACRES.

THIS TABLE ONLY INCLUDES HOST TREES

NUMBERS OF TREES

PER ACRE

DBH	TRUEFIR	LIVE	DEAD	TRUEFIR	TOPKILL	TF	PERCENT	TOTAL	PERCENTILE
-----	---------	------	------	---------	---------	----	---------	-------	------------

.4- .9	.000	30,000	.000	.000	30,000	100,000	30,000	50,000
1.0- 1.9	.000	10,000	.000	.000	10,000	100,000	10,000	10,667
2.0- 2.9	.000	5,000	5,000	.000	10,000	100,000	10,000	16,667
3.0- 3.9	.000	5,000	.000	.000	5,000	100,000	5,000	8,333
4.0- 4.9	.000	5,000	.000	.000	5,000	100,000	5,000	8,333

TOTAL	.00	55.00	5.00	.00	60.00	100.00	60.00	100.00
-------	-----	-------	------	-----	-------	--------	-------	--------

PERCENT	.00	91.67	8.33	.00	100.00			
---------	-----	-------	------	-----	--------	--	--	--

AVERAGE DIAMETER FOR HOST TREES

TRUEFIR	LIVE	DEAD	TRUEFIR	TOPKILL	TF	TOTAL
.0000		1.6273		2.1000	.0000	1.6667
						1.6667

FOREST INSECT AND DISEASE

PAGE 1

SURVEY SUMMARY
21 FEB 80

POPULATION STAND TABLE

PUEBLU CANYON

HOST SPECIES IS DOUGLAS FIR

THE PEST IS TUSSTICK MOTH

THE METHOD OF SAMPLING WAS FIXEDREG THE FIGURES IN THIS TABLE ARE BASED ON A SAMPLE OF 20 PLOTS, AND
REPRESENT AN AREA OF 100, ACRES.

PLOT SIZE = .010 ACRES.

THIS TABLE ONLY INCLUDES NON-HOST TREES

NUMBERS OF TREES

PER ACRE

DBH	POND PINE	WHITE PINE	OTHER	TOTAL	PERCENTILE
.4- .9	75,000	5,000	.000	.000	80,000 32,000
1.0- 1.9	70,000	5,000	.000	.000	75,000 30,000
2.0- 2.9	40,000	10,000	.000	.000	50,000 20,000
3.0- 3.9	25,000	.000	.000	.000	25,000 10,000
4.0- 4.9	20,000	.000	.000	.000	20,000 8,000
TOTAL	230,00	20,00	.00	.00	250,00 100,00
PERCENT	92,00	8,00	.00	.00	100,00

AVERAGE DIAMETER FOR NON-HOST TREES

POND PINE	WHITE PINE	OTHER	TOTAL
1.9761	1.8250	.0000	.0000 1.9640